

# Daikin – 100 years and beyond

Intermodal conference – Rotterdam 2024



PRODUCTION



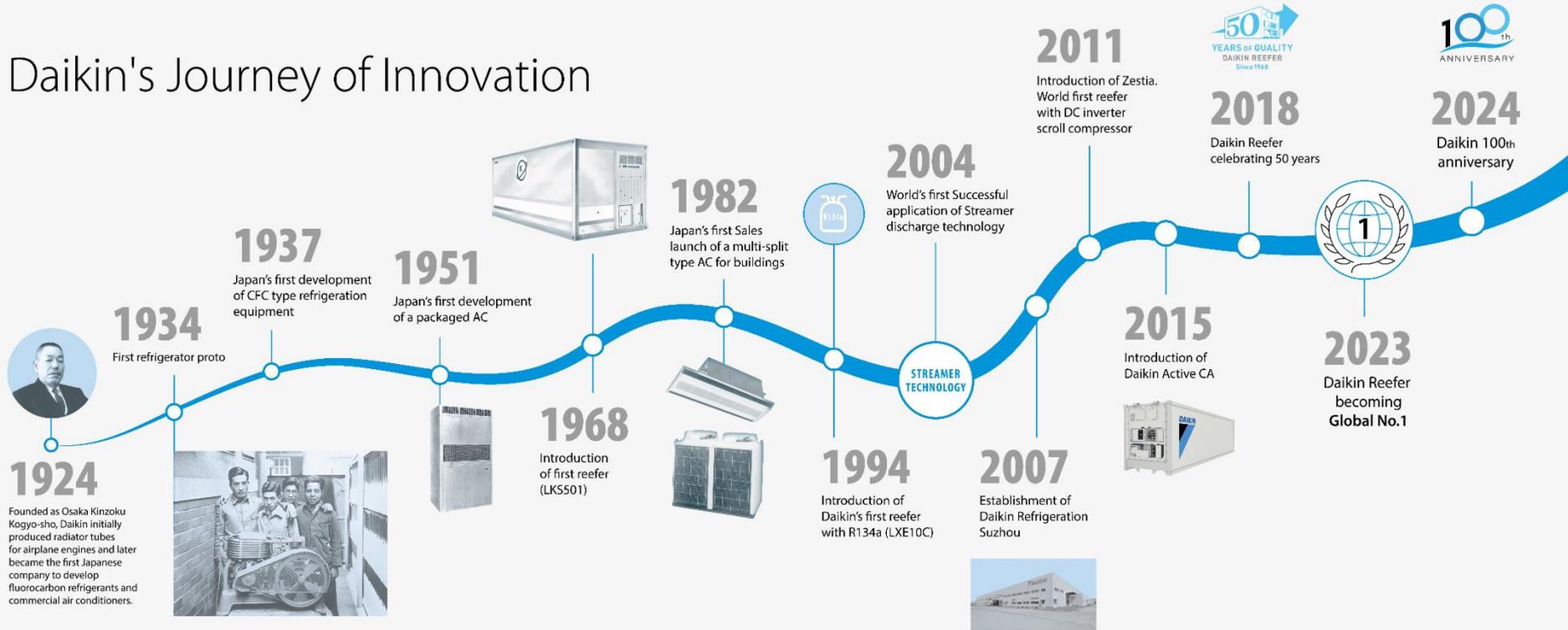
LOGISTICS



RETAIL



# Daikin's Journey of Innovation



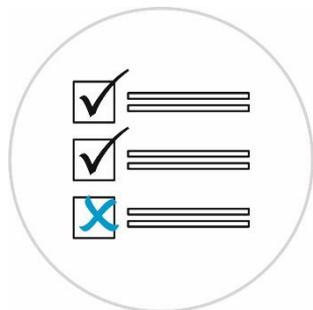
**Environment**

**Telematics**

**Refrigerant**

**Controlled Atmosphere**

**Reliability**



## Daikin environmental vision 2050

We will provide safe, healthy air environments while striving to reduce greenhouse gas emissions to net zero.



Open innovation  
IoT and AI



Open innovation  
IoT and AI



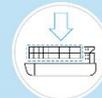
## Daikin Reefer aims to achieve net zero GHG by 2030



Power saving



Low GWP Refrigerant



From air to sea modal shift



Telematics



Production plant Carbon Neutrality

	CO2 tons	Remarks
Total CO2 emission	<b>64.38</b>	
Procurement	6.52	
Production	0.21	
Delivery	0.02	
Operation	<b>53.06</b>	51.11 from power consumption 1.95 from refrigerant leakage
Disposal	<b>4.57</b>	4.54 from improper refrigerant treatment 0.03 from disposal

# Environmental approach



Disassemble (After refrigerant removal)



Iron  
93kg



Copper  
2kg



Cable  
7kg



Motors  
36kg



Refrigerant  
5.675kg

⇒ Refrigerant disposal



Mixed metal  
204kg

⇒ After press work,  
2nd waste treatment



Compressor  
41kg

⇒ 2nd waste treatment



Heat exchanger  
53kg

Most important – treatment of refrigerant (big impact on GHG emissions)  
Disposal itself, limited impact (considering dismantel locations etc.)  
Circular economy

## What Daikin can do for **your carbon neutral target?**

1. Energy efficient product  
Continuous enhancements will reduce **30% CO2 emission**
2. Carbon neutral factory  
Daikin factory will be **Carbon neutral on year 2030.**
3. Low GWP refrigerant  
Machinery with 1234yf retrofitted.  
**Low CO2 impact by low GWP refrigerant.**

***And... CA technology would contribute***

4. Modal shift from Air to Sea

Contributions that exceed emissions

# Environmental approach

	2024		2030	Remarks
Total CO2 emission	64.38	→	0.00	
Procurement	6.52	→	3.91	40% reduction by Source from Greener supplier. Material recycle
Production	0.21	→	0.00	
Delivery	0.02	→	0.02	
Operation	53.06	→	37.14	30% power reduction 0 from gas leakage
Disposal	4.57	→	0.03	0 from improper refrigerant treatment 0.03 from disposal
Offset	0.00	→	41.1	Food loss reduction Modal shift from Air to Sea



## Refrigerants

Daikin's View:  
Evaluation Index of Refrigerant Selection  
(common for all application)



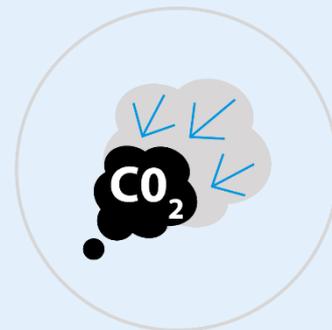
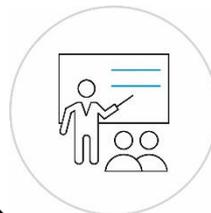
R134a  
R513a  
R1234yf

Zestia  
for 2 refrigerants

Zestia  
for 3 refrigerants

R744

R744 Model



# Telematics

DAIKIN'S TELEMATICS SOLUTION  
FOR REEFER MANAGEMENT

## Direction of value provided by Telematics



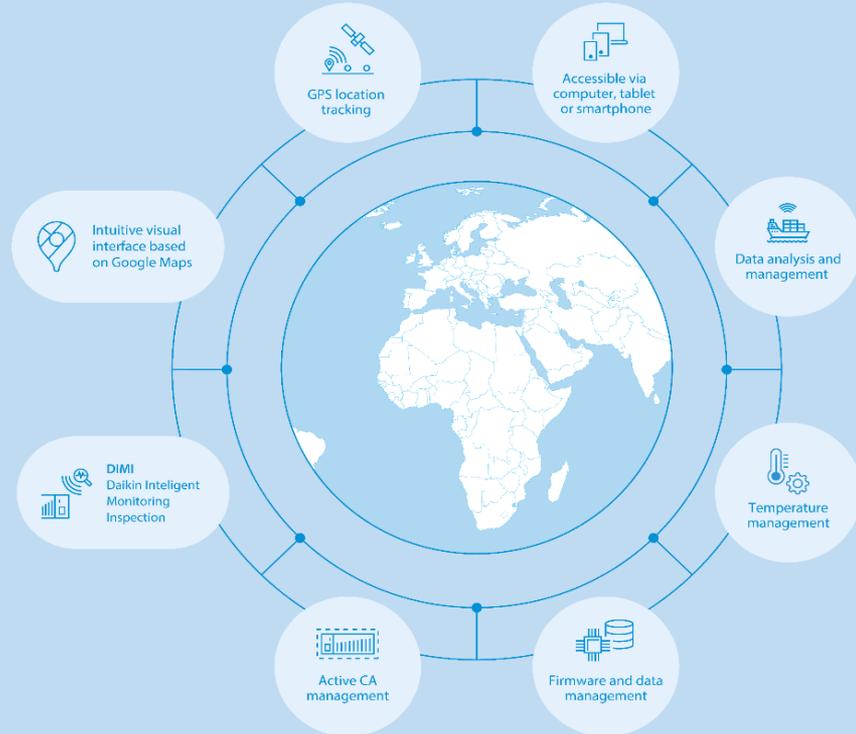
Ensure safety  
transportation



Reduce operation cost



Environmental solution





## Reefer Health Check

● Health ● Caution ● Serious

# 28

Reefer Total



➤ Range

**0-15**

**16-60**

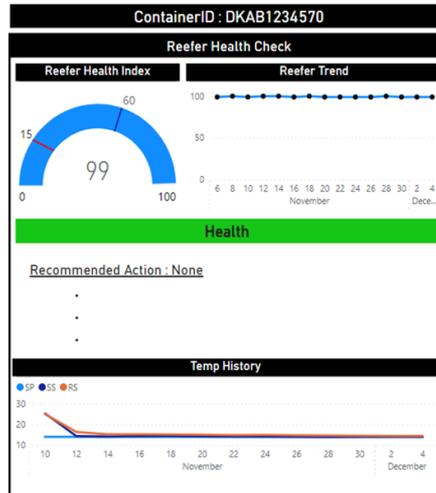
**61-100**

Serious  
PTI Required

Caution  
PTI recommended

Healthy

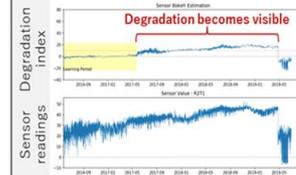
ContainerID	Reefer Category	Reefer Health	Reefer Description	CA Category	CA Health	CA Description
DKAB1234567	Health	● 89	None			
DKAB1234568	Health	● 100	None			
DKAB1234569	Caution	● 55	Recommend PTI			
DKAB1234570	Health	● 99	None	Health	● 89	None
DKAB1234571	Health	● 89	None			
DKAB1234572	Health	● 97	None			
DKAB1234573	Health	● 100	None			
DKAB1234574	Health	● 85	None			
DKAB1234575	Health	● 82	None	Health	● 100	None
DKAB1234576	Health	● 95	None			
DKAB1234577	Caution	● 53	Recommend PTI			
DKAB1234578	Health	● 91	None			
DKAB1234579	Health	● 89	None			
DKAB1234580	Health	● 100	None			
DKAB1234581	Caution	● 55	Recommend PTI			
DKAB1234582	Health	● 97	None			
DKAB1234583	Health	● 99	None			
DKAB1234584	Health	● 97	None			
DKAB1234585	Health	● 100	None			
DKAB1234586	Health	● 76	None			
DKAB1234587	Serious	● 14	Carry out PTI			
DKAB1234588	Health	● 87	None			
DKAB1234589	Health	● 98	None	Health	● 99	None
DKAB1234590	Caution	● 53	Recommend PTI			
DKAB1234591	Health	● 89	None			
DKAB1234592	Health	● 99	None			
DKAB1234593	Caution	● 55	Recommend PTI			
DKAB1234594	Health	● 89	None	Health	● 95	None



## Ongoing development

### 1. Sensor degradation Detection

Target: each sensor reading



To help engineers identify root cause

### 2. Compressor degradation Detection

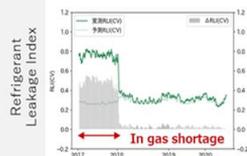
Target: compressor current



To prevent fatal damage to the unit

### 3. Refrigerant Leakage Detection

Target: refrigerant leakage index



To comply with environmental regulation

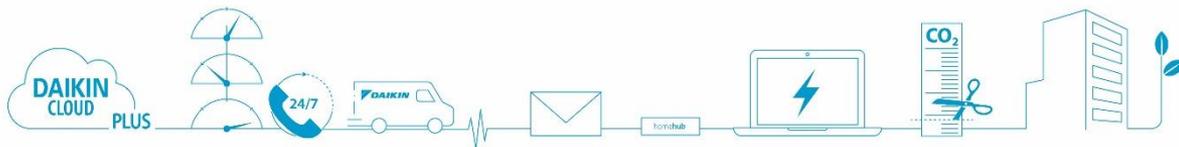
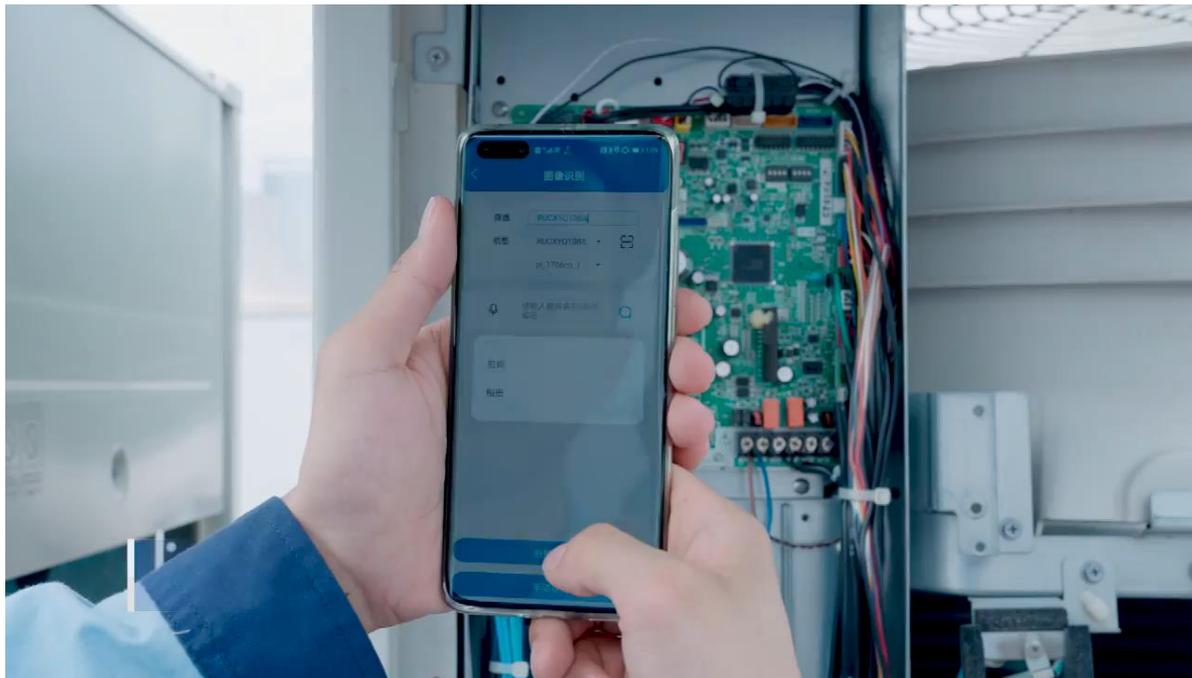
### 4. Performance Degradation Detection

Target: overall performance of unit



To comply with energy code

## Parts identification



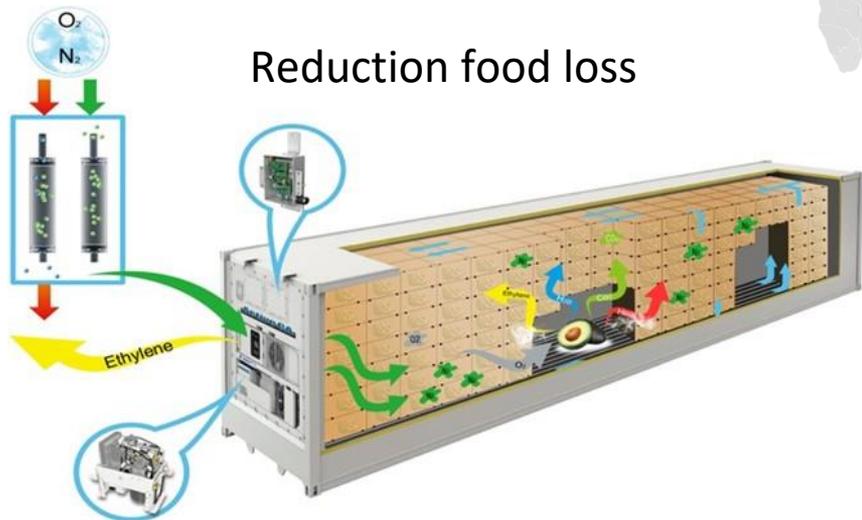
## Daikin Active CA

Established CA system since 2015  
Fine-tuning for new cargo  
Freshness control

## Modal shift from Air to Sea



## Reduction food loss



Daikin Active CA contribution

Daikin Reefer  
aims to achieve  
net zero GHG  
by 2030



Power saving



Low GWP Refrigerant



From air to sea  
modal shift



Telematics



Production plant  
Carbon Neutrality



## Reliability

- Hot gas defrost & heating
- Automatic pumpdown
- Inverter technology
- Active CA



We create solutions which meets the next  
generation



Cold Chain. Integrated.



PRODUCTION



LOGISTICS



RETAIL

